

**New hard material-reinforced stabilised zirconia ceramic****Publication number:** DE19733700**Publication date:** 1998-04-16**Inventor:** KRELL ANDREAS DR (DE); BLANK PAUL DR (DE)**Applicant:** FRAUNHOFER GES FORSCHUNG (DE)**Classification:****- International:** C04B35/488; F16C33/04; F16C33/30; C04B35/486;
F16C33/04; F16C33/30; (IPC1-7): C04B35/48;
C04B35/488; F16C33/12; F16C33/62**- european:** C04B35/488; F16C33/04C; F16C33/30**Application number:** DE19971033700 19970804**Priority number(s):** DE19971033700 19970804; DE19961040923 19961004**Report a data error here****Abstract of DE19733700**

A novel, hard material-reinforced, stabilised ZrO₂ ceramic, with mechanical stability under hydrothermal conditions, has the composition (by vol.) 5-50% hard material component with 0.2-1 μ m grain size, 2-45% Al₂O₃ with 0.1-1 μ m grain size and balance (1-30%) stabilised ZrO₂ phase with a solid solution of 2-3.5 mol% Y₂O₃ and 1-7 mol% CeO₂ (based on the ZrO₂ content in the starting powder composition) and with 0.2-0.7 μ m grain size. Production of the above ceramic involves: (a) providing a ZrO₂ powder which contains Y₂O₃ in solid solution and which is doped with Ce with high spatial distribution homogeneity wrt. the ZrO₂ particles, this homogeneity being fixed for the subsequent process steps without significantly modifying the electrokinetic properties at the ZrO₂ particle surfaces; (b) subjecting this ZrO₂ powder, of less than 0.5 μ m mean particle size, to wet mixing and grinding together with a hard material component of less than 5 μ m mean particle size and Al₂O₃ of less than 0.7 μ m mean particle size, with addition of the requisite organic pressing aid and sintering additive; and (c) moulding and sintering the resulting mixture. Preferably, the hard material component is TiC of any stoichiometry. The stabilised ZrO₂ preferably has a primary particle size of 10-60 nm and the Al₂O₃ preferably contains \leq 2% coarse particles of greater than 2 μ m size. The sintering additive preferably comprises 2-10 wt.% TiH₂.

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